

Contents

List of Boxes, Tables, and Figures	viii
Synoptic Contents	x
General Editor and Author	xv
General Introduction <i>D. P. Chattopadhyaya</i>	xvii
Preface	xxvii
Introduction	xxxv
 I The Nature of Mathematical Proof	
1 Euclid and Hilbert	3
2 Proof vs <i>Pramāṇa</i>	59
 II The Calculus in India	
3 Infinite Series and π	109
4 Time, Latitude, Longitude, and the Globe	201
5 Navigation: <i>Kamāl</i> or <i>Rāpalagai</i>	239
 III Transmission of the Calculus to Europe	
6 Models of Information Transmission	267
7 How and Why the Calculus Was Imported into Europe	321
8 Numbers in Calculus, Algorismus, and Computers	375
 IV The Contemporary Relevance of the Revised History	
9 Math Wars and the Epistemic Divide in Mathematics	411
A Distributions, Renormalization, and Shocks	425
Index	459

List of Boxes, Tables, and Figures

Boxes

2.1	<i>Pratyakṣa</i> vs induction	64
2.2	<i>Anumāna</i> vs deduction	65
2.3	<i>Śabda</i> vs scriptural testimony	65
2.4	Adding integers on a computer	93
2.5	Adding reals on a computer	97
3.1	<i>Kaṭapayādi</i> system	117
3.2	Āryabhaṭa's numerical notation	130
4.1	The not-too-soon monsoon of 2004	208
4.2	Could India's "failed" monsoon have been predicted by the right calendar?	209
4.3	Fa-Hsien's description of a sea voyage	218

Tables

1.1	A comparison of metric, synthetic, "Euclidean", and traditional geometry	36
2.1	Truth table for 3-valued logic	78
2.2	Quasi truth-functional logic	79
2.3	Possible definition of conditional	79
3.1	Mādhava's sine table	121
3.2	Accuracy of Mādhava's sine table	122
5.1	The knots with the larger piece	246
5.2	The knots with the smaller piece	247
7.1	The circumstantial trail	353

Figures

2.1	<i>Yuktibhāṣā</i> proof of the "Pythagorean" theorem	67
2.2	The fish figure	75
2.3	Quasi truth-functional world	80

3.1	Cutting corners	151
3.2	The octagon method	152
3.3	Detail of the octagon-doubling method	152
3.4	The <i>Yuktibhāṣā</i> calculation of the circumference	154
4.1	Indian longitude triangle	226
4.2	Two ways to calculate departures	230
4.3	The size of the earth and the value of the <i>zām</i>	233
5.1	Two ways of measuring angles	244
5.2	The <i>kamāl</i>	246
5.3	Solving the nautical triangle	257
A.1	The Feynman diagrams for electron and photon self-energy	441